


Enzimas de restrição


- Os “bisturis” da Biologia Molecular
- Permitem cortar moléculas de DNA de forma controlada, quebrando ligações fosfodiéster
- Juntamente com enzimas do tipo DNA ligase permitem criar moléculas de DNA recombinante

Enzimas de restrição – a descoberta que revolucionou a biologia molecular




The Nobel Prize in Physiology or Medicine 1978


"for the discovery of restriction enzymes and their application to problems of molecular genetics"



Werner Arber
1/3 of the prize
Switzerland
Biozentrum der Universität
Basel, Switzerland
b. 1929



Daniel Nathans
1/3 of the prize
USA
Johns Hopkins University School of Medicine
Baltimore, MD, USA
b. 1928
d. 1999



Hamilton O. Smith
1/3 of the prize
USA
Johns Hopkins University School of Medicine
Baltimore, MD, USA
b. 1931

The Nobel Prize in Physiology or Medicine 1978

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[Presentation Speech](#)

Werner Arber
[Autobiography](#)
[Nobel Lecture](#)
[Interview](#)
[Swedish Nobel Stamps](#)
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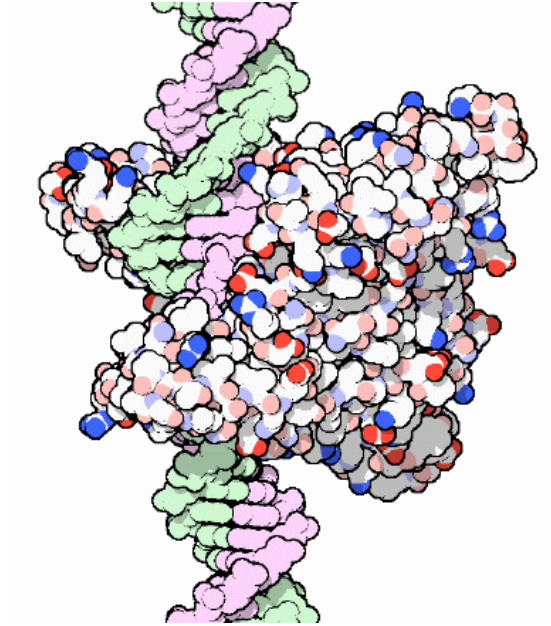
Daniel Nathans
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Hamilton O. Smith
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1977 1979

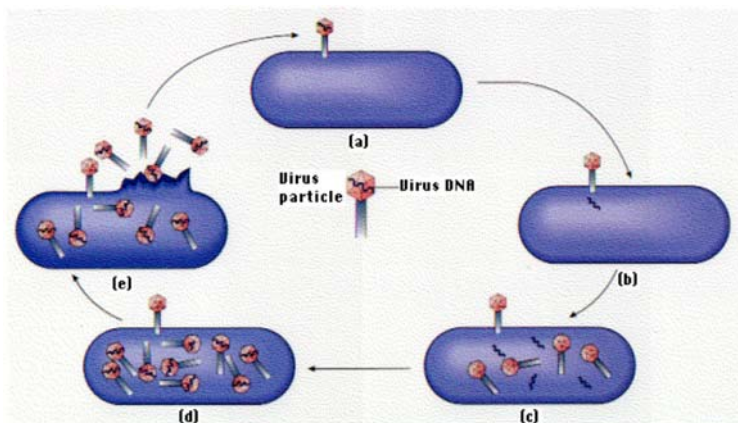
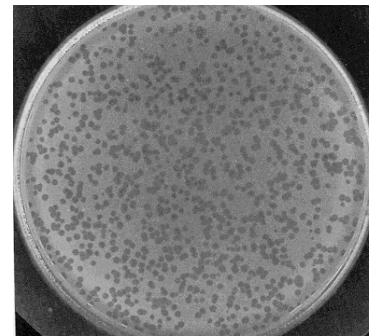
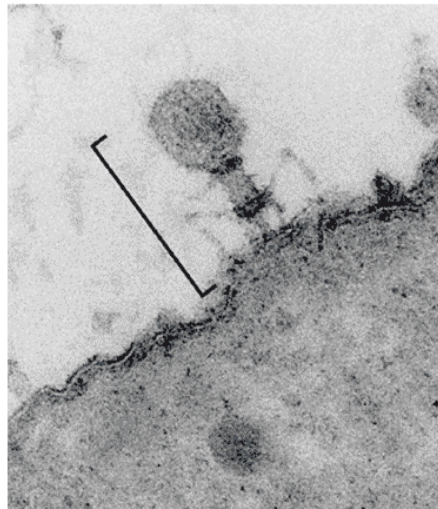
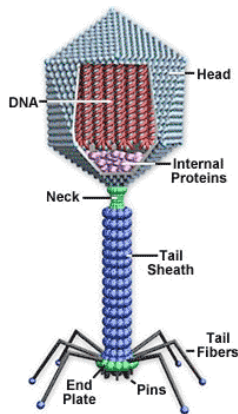
The 1978 Prize in:
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[Chemistry](#)
[Physiology or Medicine](#)
[Literature](#)
[Peace](#)
[Economic Sciences](#)

Enzimas de restrição – o sistema imunitário das bactérias

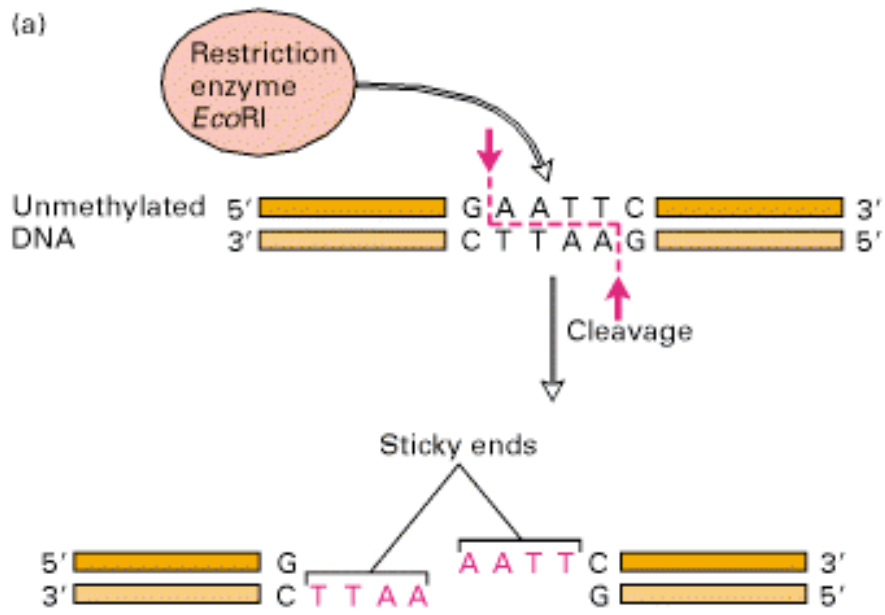


EcoRI

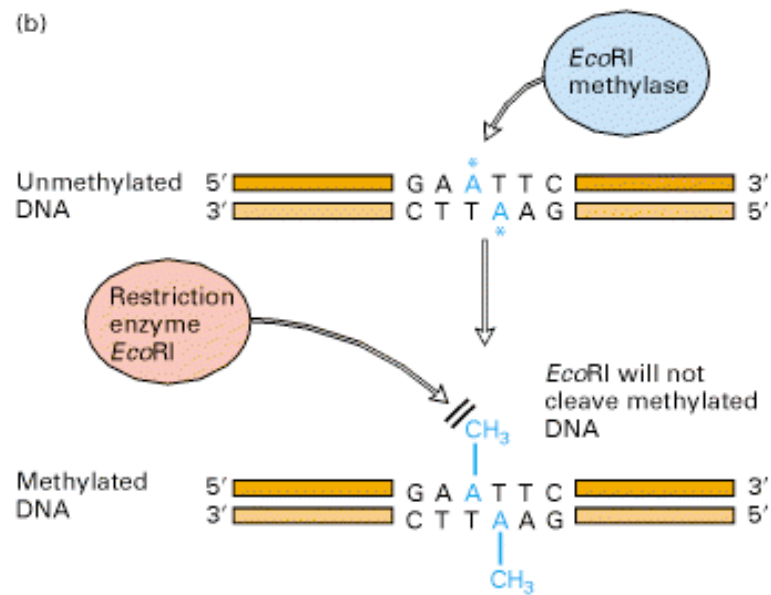
T4 bacteriophage



(a)



(b)



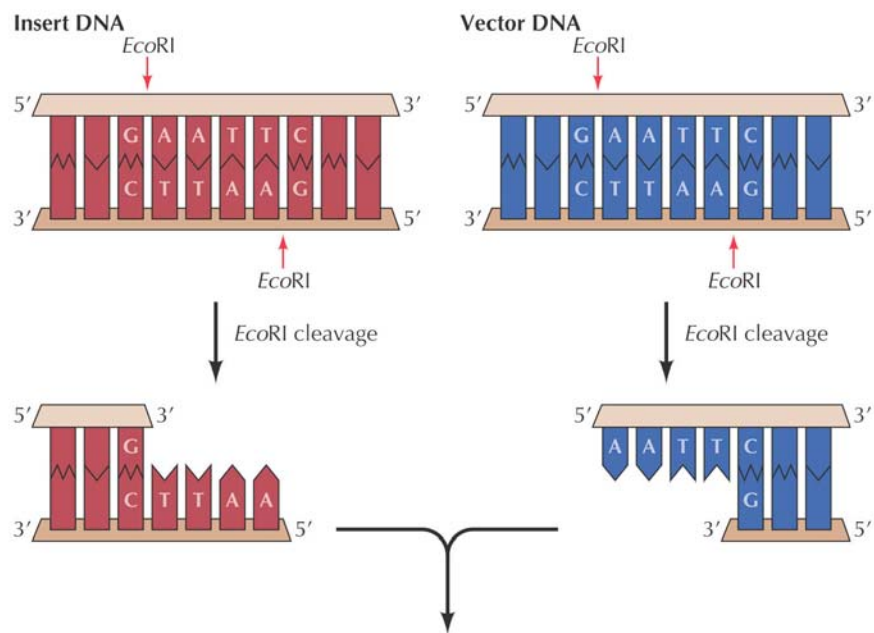
Enzimas de restrição de tipo II

- Clivam dentro ou próximo de sequências de reconhecimento específicas, de forma previsível
- Identificam-se por uma nomenclatura própria
 - Ex. *EcoRI* – primeira enzima (I) isolada do género *Escherichia* (E). Espécie *coli* (co), RY13 (R)
 - Ex. *Hind III* – terceira enzima (III) isolada de *Haemophilus influenzae*, estirpe Rd.

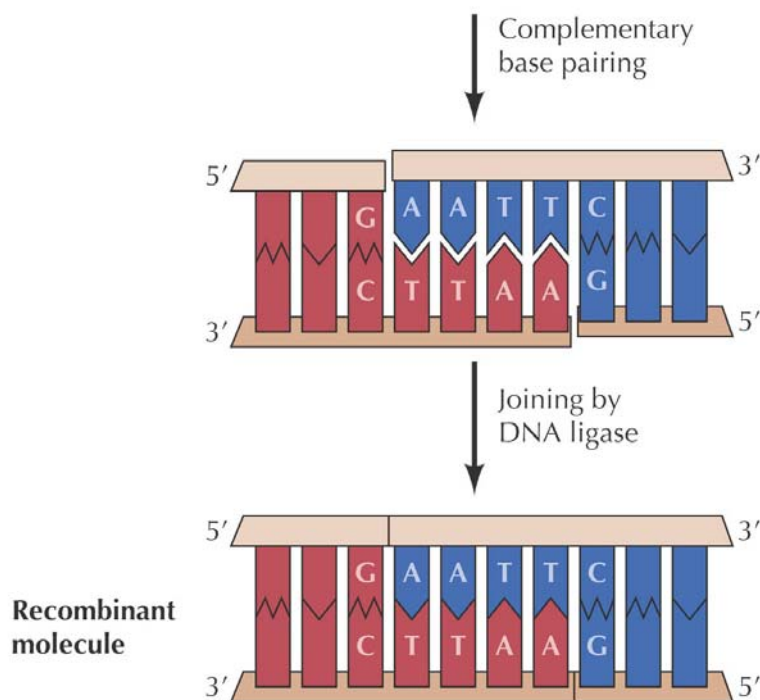
TABLE 9-1 Selected Restriction Enzymes and Their Recognition Sequences

Enzyme	Source Microorganism	Recognition Site*	Ends Produced
<i>PstI</i>	<i>Providencia stuartii</i>	↓ -C-T-G-C-A-G- -G-A-C-G-T-C- ↑	Sticky
<i>SacI</i>	<i>Streptomyces achromogenes</i>	↓ -G-A-G-C-T-C- -C-T-C-G-A-G- ↑	Sticky
<i>SalI</i>	<i>Streptomyces albue</i>	↓ -G-T-C-G-A-C- -C-A-G-C-T-G- ↑	Sticky
<i>SmaI</i>	<i>Serratia marcescens</i>	↓ -C-C-C-G-G-G- -G-G-G-C-C-C- ↑	Blunt
<i>SphI</i>	<i>Streptomyces phaeochromogenes</i>	↓ -G-C-A-T-G-C- -C-G-T-A-C-G- ↑	Sticky
<i>XbaI</i>	<i>Xanthomonas badrii</i>	↓ -T-C-T-A-G-A- -A-G-A-T-C-T- ↑	Sticky

*These recognition sequences are included in a common polylinker sequence (see Figure 9-12).



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